

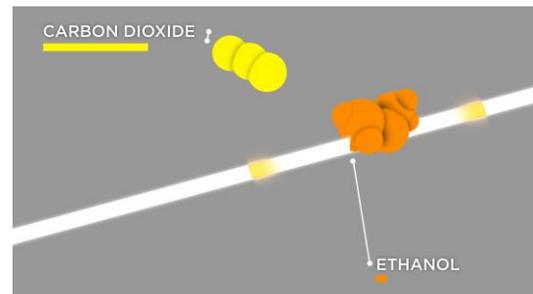
Breath-Based Technology



When it comes to measuring a person's blood alcohol concentration, most Americans are familiar with breathalyzers that require drivers to provide a deep-lung sample by blowing into a tube or other sensor. In contrast, the breath-based system being developed by Autoliv Development is designed to unobtrusively analyze alcohol in the driver's breath. Drivers will simply be able to enter the vehicle and breathe as they normally would.

How it Works: The system draws the driver's exhaled breath into a sensor, which measures the concentrations of alcohol and carbon dioxide present. The known quantity of carbon dioxide in human breath serves as an indicator of the degree of dilution of the alcohol concentration in exhaled air.

Molecules of alcohol and those of tracers such as carbon dioxide absorb infrared radiation at specific wavelengths. The Autoliv device directs infrared light beams on the breath sample and analyzes the wavelengths returned to quickly and accurately calculate the alcohol concentration. Autoliv continues to move towards a prototype that can be integrated into a vehicle by utilizing mirrors to reduce the required optical length of the device. The device is highly sensitive and able to analyze diluted breath samples at dilutions expected from a driver's natural breath plume.



Testing the Prototype: To test the prototype under development, the DADSS research program has developed a wet gas breath simulator. The simulator blends gases such as carbon dioxide, nitrogen and oxygen with moisture to create an "exhaled breath" that matches the composition, temperature and pressure of a natural human breath. Ethanol can then be added to the breath at various concentrations. In addition, the Autoliv prototype will continue to run through a series of human subject tests, as well as durability tests in different environmental situations, from temperature shifts, to sudden changes in motion, to interference such as dust or mechanical shock.



Alcohol Detection System

Integration into Vehicles: To determine how best to integrate this system into vehicles, extensive research is being undertaken to fully understand the process of the breath stream after exhalation and the breath's distribution in the cabin both from drivers and passengers. Some possible locations include the driver's side door and the steering column. Another approach under consideration is to have multiple sensors placed strategically in the vehicle cabin that would allow the system to determine that the breath sample is from the driver and not from other passengers.



The Manufacturer: Swedish-based Autoliv Development AB is a Fortune 500 company and Tier One automotive supplier, ensuring the technology can be produced to scale and at a reasonable price.